Office of Energy Efficiency and Renewable Energy

Lightweight Composite Materials Applications

Background

Successful development of highly fuel-efficient vehicles requires that lightweight materials be used in their construction. Currently available "lightweight" materials could reduce vehicle weight by more than 60%. These materials are costly, however, and the ease in which they can be incorporated into designs and the associated manufacturing processes are inadequate to produce safe, durable, recyclable, and affordable cars.

Since 1991, DOE has worked with the Automotive Composites Consortium (ACC), an element of the United States Council for Automotive Research (USCAR). The goal is to produce a range of lighter materials at the rates and robustness needed by automotive manufacturing schedules at lifecycle costs comparable with current materials. Because no single material will satisfy all the component needs of a vehicle, research is being done on both metals and composites.

Accomplishments

- Joint OAAT/ACC research has produced material-joining technologies, crash-energy management models, in-service design data, a suite of durability test protocols, and high-volume production technologies.
- Domestic automobile manufacturers have adopted the evolving technologies and initiated proprietary research for specific vehicle applications.

Benefits

- Lightweight materials will facilitate dramatic improvements in automobile fuel efficiency.

Composite Material Impact Test Facility, Oak Ridge National Laboratory

- Cost-competitive advanced materials, engineering design data and models, and manufacturing techniques will improve the international competitiveness of the U.S. auto industry.

Future Activities

- Reduce material costs and improve manufacturing rates to make these materials competitive.
- Develop long-term design data and crash-energy management models to enable cost-effective engineering of new vehicle platforms.

Partners in Success

USCAR's Automotive Composites Consortium (DaimlerChrysler Corporation, Ford Motor Company, and General Motors Corporation)

Contact

Joe Carpenter: (202) 586-1022

OFFICE OF TRANSPORTATION TECHNOLOGIES

April 1999